I.B.2.N.b. Montane or boreal cold-deciduous forest

I.B.2.N.b.1. ACER GRANDIDENTATUM MONTANE FOREST ALLIANCE

Bigtooth Maple Montane Forest Alliance

ACER GRANDIDENTATUM / QUERCUS GAMBELII FOREST

Bigtooth Maple / Gambel Oak Forest

ELEMENT CONCEPT

GLOBAL SUMMARY: This forest association has been reported from mountains and plateaus of Utah. Elevations range from 1220-2620 m. Sites include moderate to steep, middle and lower slopes with cool northern or eastern aspects, intermittently flooded canyon bottoms, alluvial benches, and shaded colluvial slopes. *Acer grandidentatum* and *Quercus gambelii* codominate the tree canopy. The understory is variable and may be dominated by tall or short shrubs. Species include *Prunus virginiana, Rosa woodsii, Symphoricarpos oreophilus, Physocarpus malvaceus, Mahonia repens*, and seedling trees. The herbaceous layer is generally sparse because of heavy shading. Stands transition to *Quercus gambelii* woodland in the drier uplands.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Not Applicable

Zion National Park Environment: This association occurs on moderate to steep, northerly and easterly slopes, canyon-shaded colluvial slopes, and ravines at elevations of 4000-8000 feet. Soils are variable, ranging from sand to clay loam.

Global Environment: This forest association occurs in the mountains and plateaus of Utah. Elevations range from 1220-2620 m. Sites include moderate to steep, middle and lower slopes with cool northern or eastern aspects, intermittently flooded canyon bottoms, alluvial benches, and shaded colluvial slopes. These forests typically occur on these relatively mesic sites, especially at lower latitudes and elevations. However, stands have been reported on dry, open slopes in the northern part of its range in the Wasatch Mountains where fire suppression may be allowing oak-dominated stands to succeed to mixed maple-oak. Substrates are generally calcareous and rocky with soil textures ranging from sand to clay loam.

VEGETATION DESCRIPTION

Zion National Park Vegetation: In this association *Acer grandidentatum* cover is frequently over 50% in the tree and shrub layers combined. *Quercus gambelii* is absent to abundant in both the tree and shrub layers and may exceed cover of *Acer grandidentatum*. *Celtis laevigata var. reticulata* may be present in the canopy. Canopy trees average 10-15 m in height and 15 cm dbh. *Juniperus scopulorum* and/or *Pinus ponderosa* occasionally occur in ravines as an emergent tree layer, and contribute 10-30% cover with a dense subcanopy of *Acer grandidentatum* and *Quercus gambelii*. *Symphoricarpos oreophilus* contributes minor cover in the shrub layer, and few other shrubs are present with the *Acer grandidentatum* and *Quercus gambelii*. Herbaceous cover is variable, 5-30%, and most commonly represented by *Pteridium aquilinum, Poa pratensis, Bromus diandrus*, and *Poa fendleriana*.

Global Vegetation: This association is characterized by a moderately dense to dense tree canopy of *Acer grandidentatum* that is typically codominated by *Quercus gambelii*. *Celtis laevigata var. reticulata, Juniperus scopulorum*, or *Juniperus osteosperma* may also be present to abundant. The shrub layer is variable, depending on the stand age, elevation and habitat. It ranges from dense *Quercus gambelii*-dominated tall-shrub stratum to a mixed short-shrub layer that includes *Symphoricarpos oreophilus, Prunus virginiana, Amelanchier utahensis, Mahonia repens, Physocarpus malvaceus, Paxistima myrsinites*, and *Rosa woodsii*. The herbaceous layer is generally sparse because of shading. Associates such as *Elymus glaucus, Poa fendleriana, Heterotheca villosa, Thalictrum fendleri, Carex hoodii, Vicia americana*, and species of *Lathyrus, Osmorhiza, Eriogonum*, and *Polygonum* may be present.

Global Dynamics: This association is closely related to oakbrush types of Utah (*Quercus gambelii*-dominated and codominated communities), sharing many of the same species (Reem 1960, 1964, Kunzler et al. 1981). Kunzler et al. (1981) suggested that the maple stands sampled by Reem (1960, 1964) in the Wasatch Mountains are likely late-seral stages of the oakbrush types.

Quercus gambelii is a fire-adapted rhizomatous shrub that can form dense clones and will vigorously resprout after a burn (FEIS 2001). *Acer grandidentatum* is also rhizomatous, but resprouts much less vigorously after burning, so *Quercus gambelii* is favored by frequent fires (FEIS 2001). However, throughout much of this association's range, stands are restricted to relatively mesic sites such as along streams, shady canyon bottoms, and on cool northern aspects at higher elevations where fire is less frequent. Where stands are more widespread in the northern part of its range in the Wasatch Mountains, *Acer grandidentatum* has recently been invading *Quercus gambelii* stands growing on open slopes with warm aspects. Harper et al. (1985) suggested these drier sites had greater fire frequency prior to fire suppression that favored the more fire-adapted oak. Now with fire suppression, *Acer grandidentatum* has been slowly colonizing these relatively xeric habitats. Research is needed to verify this hypothesis.

MOST ABUNDANT SPECIES

Zion National Park

Stratum	Species
TREE CANOPY	*Acer grandidentatum, Quercus gambelii*
TALL SHRUB	*Acer grandidentatum, Quercus gambelii, Symphoricarpos oreophilus*
GRAMINOID	*Bromus diandrus, Poa fendleriana, Poa pratensis*

Global

Stratum	Species
TREE CANOPY	*Acer grandidentatum, Juniperus scopulorum, Quercus gambelii*
TALL SHRUB	*Acer grandidentatum, Quercus gambelii*
SHORT SHRUB	*Symphoricarpos oreophilus*
GRAMINOID	*Poa fendleriana*

CHARACTERISTIC SPECIES

Zion National Park

Stratum	Species
TREE CANOPY	*Acer grandidentatum, Quercus gambelii*
TALL SHRUB	*Acer grandidentatum, Quercus gambelii*

Global

Stratum	Species
TREE CANOPY	*Acer grandidentatum, Quercus gambelii*

OTHER NOTEWORTHY SPECIES

Global

Stratum	Species
GRAMINOID	*Bromus diandrus, Bromus tectorum, Poa pratensis*

GLOBAL SIMILAR ASSOCIATIONS:

- Abies concolor / Acer grandidentatum Forest (CEGL000241)
- Pseudotsuga menziesii / Acer grandidentatum Forest (CEGL000419)
- Acer grandidentatum / Calamagrostis rubescens Forest (CEGL000558)
- Populus angustifolia / Acer grandidentatum Forest (CEGL000646)

GLOBAL STATUS AND CLASSIFICATION COMMENTS

Global Conservation Status Rank: G4G5.

Global Comments: *Acer grandidentatum* and *Quercus gambelii* both are widespread western species and occur in the understory of several conifer-dominated associations. There are several similar forest associations that are dominated by *Acer grandidentatum* with one of several oak species codominant or in the understory. Both *Acer grandidentatum* and *Quercus gambelii* have shrub and tree forms which complicate the vegetation classification of this mixed type. This association is typically late seral with some large single- or few-stemmed maples and oaks that are over 5 m tall.

ELEMENT DISTRIBUTION

Zion National Park Range: This association occurs throughout the park in shaded canyon bottoms, alluvial benches, and high-elevation mountain toeslopes.

Global Range: This forest association is documented from the Wasatch and Uinta ranges in northeastern Utah and the Markagunt Plateau in southwestern Utah.

Nations: US
States/Provinces: UT

ELEMENT SOURCES

Zion National Park Inventory Notes: Plots: RH28, RH66, RH74, 15, 27, 123, 209, 260
Classification Confidence: 2 **Identifier:** CEGL000559
REFERENCES: Allman 1952, Bourgeron and Engelking 1994, Christensen 1955, Driscoll et al. 1984, FEIS 2001, Harper et al. 1985, Kunzler et al. 1981, Ream 1960, Ream 1964